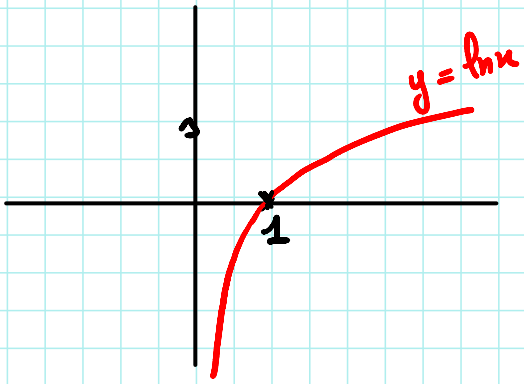
# Fonction ln

**Déf**




$f(x) = \ln x$ ; $D_f = ]0, +\infty[$

| $x$ | $0$ | $+\infty$ |
|---|---|---|
| $\ln$ | $\|\|$ | $+\infty$ |
| | $\|\|$ | $-\infty$ |

| $x$ | $0$ | $1$ | $+\infty$ |
|---|---|---|---|
| $\ln x$ | $\|\|$ | $-$ $0$ | $+$ |

Rq (ln 0,3) $x \geq 5$.

$x \leq \frac{5}{\ln 0{,}3}$

car $\ln 0{,}3 < 0$

**Propriétés** $a, b \in \mathbb{R}_+^*$

$\ln 1 = 0$, $\ln e = 1$ $\quad e \simeq 2{,}71$

- $\ln(a \times b) = \ln a + \ln b \longrightarrow \ln(2e) = \ln 2 + \ln e = 1 + \ln 2$
- $\ln\left(\frac{1}{a}\right) = -\ln a \longrightarrow \ln\left(\frac{1}{e}\right) = -1$
- $\ln\left(\frac{a}{b}\right) = \ln a - \ln b \longrightarrow \ln\left(\frac{2}{e}\right) = \ln 2 - 1$
- $\ln a^n = n \ln a \longrightarrow \ln(\sqrt{2}) = \ln 2^{\frac{1}{2}} = \frac{1}{2} \ln 2$

## Equation - Inéquation

$a, b \in \mathbb{R}_+^*$

$\ln a = \ln b \iff a = b$

$\ln a \geq \ln b \iff a \geq b$.

$\ln e^a = a$

$\ln x = a = \ln e^a$

$\iff x = e^a$.